

## ⑫ 公開特許公報(A)

昭62-129759

⑪ Int. Cl.<sup>4</sup>G 01 N 35/02  
31/22  
33/483

識別記号

1 2 1

庁内整理番号

8506-2G  
8506-2G  
8305-2G

⑬ 公開 昭和62年(1987)6月12日

※審査請求 未請求 発明の数 7 (全31頁)

⑭ 発明の名称 毛管流れ装置

⑮ 特 願 昭61-182050

⑯ 出 願 昭61(1986)8月4日

優先権主張 ⑰ 1985年8月5日 ⑱ 米国(US) ⑲ 762748

⑳ 発 明 者 ジミー デー. アレ  
ン アメリカ合衆国, カリフォルニア 94022, ロス アルト  
ス, ロズモント アベニュー 1070㉑ 発 明 者 マイケル イー. コブ  
アメリカ合衆国, カリフォルニア 95112, サン ホセ,  
サウス ワンハンドレッド アンド サーティーンズ ス  
トリート 656㉒ 出 願 人 バイオトラック, イン  
コーポレイテッド アメリカ合衆国, カリフォルニア 94089, サニベール,  
エルコ ドライブ 1234

㉓ 代 理 人 弁理士 青 木 朗 外4名

最終頁に続く

## 明細書の淨登(内容に変更なし)

## 明 細 書

## 1. 発明の名称

毛管流れ装置

## 2. 特許請求の範囲

1. 装置を使用して流体媒質中の分析対象を測定する方法であって、前記装置は、該装置内の流体媒質を動かすための駆動力として作用する少なくとも1つの毛管ユニット、少なくとも1つのチャンバーユニット、入口、前記入口から離れた出口、および前記装置内に収容された試薬を含んで成り、前記試薬は検出系の1構成員であり、前記毛管はアッセイ媒質の計量ポンプおよび流れ制御器として作用して時間制御された前記試薬との反応を提供し、前記方法は、

前記入口を通して流体試料を前記ユニットの1つの中に導入し、そして前記流体試料を1つのユニットから次のユニットに前記毛管ユニットにより制御された速度で移動させ、そして前記試薬と反応させて、前記検出系により生成された検出可能な信号を発生させ、

そして前記信号を前記流体媒質中の前記分析対象の存在の測定結果として決定する、  
ことを含んで成ることを特徴とする方法。

2. 前記検出系が粒子を含み、そして粒子の通路を光散乱器で観測する特許請求の範囲第1項記載の方法。

3. 少なくとも1つのチャンバーユニットがフィルターを含む特許請求の範囲第1項記載の方法。

4. 装置を使用して流体媒質中の分析対象を測定する方法であって、前記装置は少なくとも2つの毛管ユニット、該毛管ユニットにより分離されている少なくとも2つのチャンバーユニット、入口、前記入口から離れた出口、およびチャンバーユニットA内で装置表面へ結合した試薬を含んで成り、前記試薬は検出系の1構成員であり、ここで前記毛管はアッセイ媒質の流速を制御して、時間制御された前記試薬との反応を提供し、前記方法は、

前記入口を通して前記流体媒質を第1チャンバーユニットに導入し、

REFERENCE (5)

Application No.: 182050/1986  
Application Date: August 4, 1986

Convention Priority(ies): US Pat. Appln.  
No. 762748  
(Filed on August 5, 1985)

Publication No.: 129759/1987  
Publication Date: June 12, 1987

Applicant: Biotrack Inc.  
Inventor: Cobb; Michael E.  
Allen; Jimmy D.

Title of Invention: "Capillary flow device"

Number of Independent Claim(s): 17

# Result of Patent Family Search for JP-A-62-129759

DIALOG(R)File 352:Derwent WPI  
(c) 2001 Derwent Info Ltd. All rts. reserv.

007057978

WPI Acc No: 1987-057975/198709

Analyte determ. in a fluid - using a device having a capillary unit  
acting as the motive force for moving the fluid

Patent Assignee: BIOTRACK INC (BIOT-N); BIOTRACK (BIOT-N)

Inventor: ALLEN J D; COBB M E; GIBBONS I; HILLMAN R S; OSTOICH V E;  
WINFREY

L J

Number of Countries: 015 Number of Patents: 023

Patent Family:

| Patent No     | Kind | Date     | Applicat No | Kind | Date     | Week     |
|---------------|------|----------|-------------|------|----------|----------|
| EP 212314     | A    | 19870304 | EP 86110184 | A    | 19860724 | 198709 B |
| AU 8660884    | A    | 19870212 |             |      |          | 198715   |
| • JP 62129759 | A    | 19870612 | JP 86182050 | A    | 19860804 | 198729   |
| US 4756884    | A    | 19880712 | US 86880793 | A    | 19860701 | 198830   |
| US 4948961    | A    | 19900814 | US 88177625 | A    | 19880405 | 199035   |
| US 4963498    | A    | 19901016 | US 88144416 | A    | 19880115 | 199044   |
| CA 1275231    | C    | 19901016 |             |      |          | 199047   |
| US 5004923    | A    | 19910402 | US 90472130 | A    | 19900130 | 199116   |
| US 5140161    | A    | 19920818 | US 85762748 | A    | 19850805 | 199236   |
|               |      |          | US 86880793 | A    | 19860701 |          |
|               |      |          | US 88177625 | A    | 19880405 |          |
|               |      |          | US 90472130 | A    | 19900130 |          |
|               |      |          | US 91651283 | A    | 19910205 |          |
|               |      |          | US 91734597 | A    | 19910723 |          |
| US 5144139    | A    | 19920901 | US 85762748 | A    | 19850805 | 199238   |
|               |      |          | US 86880793 | A    | 19860701 |          |
|               |      |          | US 88177625 | A    | 19880405 |          |
|               |      |          | US 90472130 | A    | 19900130 |          |
|               |      |          | US 91651283 | A    | 19910205 |          |
|               |      |          | US 91732596 | A    | 19910719 |          |
| US 5164598    | A    | 19921117 | US 85762748 | A    | 19850805 | 199249   |
|               |      |          | US 86880793 | A    | 19860701 |          |
|               |      |          | US 88177625 | A    | 19880405 |          |
|               |      |          | US 90472130 | A    | 19900130 |          |
|               |      |          | US 91651283 | A    | 19910205 |          |
| US 5300779    | A    | 19940405 | US 85762748 | A    | 19850805 | 199413   |
|               |      |          | US 86880793 | A    | 19860701 |          |
|               |      |          | US 88177625 | A    | 19880405 |          |
|               |      |          | US 90472130 | A    | 19900130 |          |
|               |      |          | US 91651283 | A    | 19910205 |          |
|               |      |          | US 92931719 | A    | 19920818 |          |
| EP 212314     | B1   | 19940427 | EP 86110184 | A    | 19860724 | 199417   |
| JP 6094722    | A    | 19940408 | JP 86182050 | A    | 19860804 | 199419   |
|               |      |          | JP 92219280 | A    | 19860804 |          |
| JP 6094723    | A    | 19940408 | JP 86182050 | A    | 19860804 | 199419   |
|               |      |          | JP 92219281 | A    | 19860804 |          |
| JP 6094724    | A    | 19940408 | JP 86182050 | A    | 19860804 | 199419   |
|               |      |          | JP 92219282 | A    | 19860804 |          |
| DE 3689812    | G    | 19940601 | DE 3689812  | A    | 19860724 | 199423   |

|             |    |          |             |   |          |        |
|-------------|----|----------|-------------|---|----------|--------|
|             |    |          | EP 86110184 | A | 19860724 |        |
| JP 94058373 | B2 | 19940803 | JP 86182050 | A | 19860804 | 199429 |
| JP 7092169  | A  | 19950407 | JP 86182050 | A | 19860804 | 199523 |
|             |    |          | JP 9434927  | A | 19860804 |        |
| JP 95069330 | B2 | 19950726 | JP 86182050 | A | 19860804 | 199534 |
|             |    |          | JP 92219280 | A | 19860804 |        |
| JP 95104356 | B2 | 19951113 | JP 86182050 | A | 19860804 | 199550 |
|             |    |          | JP 9434927  | A | 19860804 |        |
| JP 95117546 | B2 | 19951218 | JP 86182050 | A | 19860804 | 199604 |
|             |    |          | JP 92219282 | A | 19860804 |        |
| JP 2595422  | B2 | 19970402 | JP 86182050 | A | 19860804 | 199718 |
|             |    |          | JP 92219281 | A | 19860804 |        |

Priority Applications (No Type Date): US 86880793 A 19860701; US 85762748 A 19850805; US 88177625 A 19880405; US 88144416 A 19880115; US 90472130 A

19900130; US 91651283 A 19910205; US 91734597 A 19910723; US 91732596 A

19910719; US 92931719 A 19920818

Cited Patents: 3.Jnl.Ref; A3...8929; AT 376300; DE 2007405; DE 3134611; No-SR.Pub; US 3799742; US 4088448; US 4233029

Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|-----------|------|-----|----|----------|--------------|
|-----------|------|-----|----|----------|--------------|

|           |   |   |    |  |  |
|-----------|---|---|----|--|--|
| EP 212314 | A | E | 70 |  |  |
|-----------|---|---|----|--|--|

Designated States (Regional): AT BE CH DE FR GB IT LI LU NL SE

|            |   |    |  |  |  |
|------------|---|----|--|--|--|
| US 4756884 | A | 20 |  |  |  |
|------------|---|----|--|--|--|

|            |   |    |             |                                |  |
|------------|---|----|-------------|--------------------------------|--|
| US 5140161 | A | 20 | G01N-021/49 | CIP of application US 85762748 |  |
|------------|---|----|-------------|--------------------------------|--|

Div ex application US 86880793

Div ex application US 88177625

Cont of application US 90472130

Cont of application US 91651283

Div ex patent US 4756884

Div ex patent US 4948961

|            |   |    |             |                                |  |
|------------|---|----|-------------|--------------------------------|--|
| US 5144139 | A | 20 | G01N-021/49 | CIP of application US 85762748 |  |
|------------|---|----|-------------|--------------------------------|--|

Div ex application US 86880793

Div ex application US 88177625

Cont of application US 90472130

Cont of application US 91651283

Div ex patent US 4756884

Div ex patent US 4948961

Cont of patent US 5004923

|            |   |    |             |                                |  |
|------------|---|----|-------------|--------------------------------|--|
| US 5164598 | A | 20 | G01N-021/49 | CIP of application US 85762748 |  |
|------------|---|----|-------------|--------------------------------|--|

Div ex application US 86880793

Div ex application US 88177625

Cont of application US 90472130

Div ex patent US 4756884

Div ex patent US 4948961

Cont of patent US 5004923

|            |   |    |             |                                |  |
|------------|---|----|-------------|--------------------------------|--|
| US 5300779 | A | 22 | G01N-021/49 | CIP of application US 85762748 |  |
|------------|---|----|-------------|--------------------------------|--|

Div ex application US 86880793

Div ex application US 88177625

Cont of application US 90472130

Cont of application US 91651283

Div ex patent US 4756884  
 Div ex patent US 4948961  
 Cont of patent US 5004923  
 Cont of patent US 5164598

EP 212314 B1 E 36 G01N-021/03  
 Designated States (Regional): AT BE CH DE FR GB IT LI LU NL SE  
 JP 6094722 A 24 G01N-033/86 Div ex application JP 86182050  
 JP 6094723 A 23 G01N-033/86 Div ex application JP 86182050  
 JP 6094724 A 23 G01N-033/86 Div ex application JP 86182050  
 DE 3689812 G G01N-021/03 Based on patent EP 212314  
 JP 94058373 B2 22 G01N-033/86 Based on patent JP 62129759  
 JP 7092169 A 24 G01N-033/86 Div ex application JP 86182050  
 JP 95069330 B2 23 G01N-033/86 Div ex application JP 86182050  
 Based on patent JP 6094722  
 JP 95104356 B2 23 G01N-033/86 Div ex application JP 86182050  
 Based on patent JP 7092169  
 JP 95117546 B2 23 G01N-033/86 Div ex application JP 86182050  
 Based on patent JP 6094724  
 JP 2595422 B2 23 G01N-033/86 Div ex application JP 86182050  
 Previous Publ. patent JP 6094723

**Abstract (Basic): JP 7092169 A**

A method for determining an analyte in a fluid medium uses a device comprising at least one capillary unit acting as the motive force for moving the fluid medium in the device, at least one chamber unit, an inlet port, an outlet port distant from the inlet port and a reagent contained within the device, the reagent being a member of a detection system, where the capillary acts as a metering pump and flow controller of the assay medium through the device to provide for a time controlled reaction with the reagent.

A fluid sample is introduced through the inlet port into one of the units, and the fluid allowed to transit from one unit to the next unit at a rate controlled by the capillary unit and react with the reagent resulting in a detectable signal produced by the detection system. Pref. the device is made from acrylonitrile -butadiene -styrene copolymer.

**USE/ADVANTAGE** - The method can be used with a wide variety of fluids, partic. physiological fluids, for detection of e.g. drugs, pathogens, glucose or serum enzymes. The devices provide for simple measurements of volumes, mixing of reagents, incubations and visual or instrumental determin. of the result.

**EP 212314 A**

A method for determining an analyte in a fluid medium uses a device comprising at least one capillary unit acting as the motive force for moving the fluid medium in the device, at least one chamber unit, an inlet port, an outlet port distant from the inlet port and a reagent contained within the device, the reagent being a member of a detection system, where the capillary acts as a metering pump and flow controller of the assay medium through the device to provide for a time controlled reaction with the reagent.

A fluid sample is introduced through the inlet port into one of the units, and the fluid allowed to transit from one unit to the next unit at a rate controlled by the capillary unit and react with the

reagent resulting in a detectable signal produced by the detection system. Pref. the device is made from acrylonitrile -butadiene -styrene copolymer.

USE/ADVANTAGE - The method can be used with a wide variety of fluids, partic. physiological fluids, for detection of e.g. drugs, pathogens, glucose or serum enzymes. The devices provide for simple measurements of volumes, mixing of reagents, incubations and visual or instrumental determ. of the result.

Dwg.0/8

Abstract (Equivalent): EP 212314 B

A method for determining the presence of an amount of an analyte in, or a property of, a fluid sample comprising: applying said sample to a device (10) comprising an entry port (14) for said sample, a vent (22), a capillary pathway containing a chamber (12,20) connecting said entry port (14) to said vent (22), and a reagent (16,24) in said capillary pathway (12,20), wherein said sample flows through said capillary pathway (12,20) under capillary forces and interaction of said reagent (16,24) with said sample modifies viscosity of said sample or a characteristic of said sample associated with said flow; allowing said sample to interact with said reagent (16,24) and traverse at least a portion of said capillary pathway (12,20); detecting said viscosity or flow characteristic; and relating said viscosity or flow characteristic to the presence or amount of said analyte in or, to said property of, said fluid sample.

Dwg.1/8

Abstract (Equivalent): US 5300779 A

An assay based on measuring blood coagulation time is performed by inserting into an electronic monitor a housing with a capillary passage (12) between an inlet port (14) and a vent (22), and reagent (16) inducing blood clotting on the passage surface, and introducing a sample into the port before or after placing in the monitor.

The monitor detects coagulation by sensing interaction of light with particles in the passage, and the measured coagulation time is related to the presence or amount of analyte. In partic., the reagent is thromboplastin, and the sample is whole blood or blood from which red cells have been removed. The housing is e.g. of injection-moulded ABS.

ADVANTAGE - Allows individual assays to be carried out rapidly and accurately with min. equipment.

Dwg.1/8

US 5164598 A

A system for detecting the presence of an analyte in or a characteristic of blood comprises a housing (50) with a capillary passage (76) for drawing in blood solely by capillary attraction, and a reagent in the passage causing the blood to clot. A monitor can hold the housing and pass light through the passage to detect and analyse light scattering to determine when clotting occurs.

The housing is pref. hydrophobic and has at least a part of the walls treated to be hydrophilic, the passage having hydrophilic walls. The reagent is a member of a system providing a detectable signal in relation to the analyte or characteristic. The housing is pref. formed of cellulose acetate, polystyrene or ABS.

USE/ADVANTAGE - E.g, detection of prothrombin time, crosslinked

fibrin dimer, or direct or indirect blood grouping, permits rapid and convenient testing.

US 5144139 A

Agglutination of particles is detected by adding a fluid sample to a capillary passageway in a cartridge contg. a diagnostic reagent that reacts with the sample to produce an agglutination system, and passing a light beam (e.g. laser) through the sample to detect agglutinated particles.

ADVANTAGE - Rapid testing. (Dwg.2a/8)e

US 5140161 A

An analyte in a blood sample is determined using a device with a capillary passageway (76) for moving blood into the device and which contains a reagent interacting with the blood to cause a change in fluidity to provide a detectable signal. Change in fluidity is used as a measure of the presence of an analyte or a property of the sample.

The detectable signal is pref. change in sample flow rate, clotting of the sample or a change in light transmission or emission. The device may be made as an injection moulding of e.g. ABS, and the reaction may involve the binding of members of a pair or an enzyme reaction.

ADVANTAGE - Permits rapid determination with min. user manipulation. (Dwg.2a/8)

US 5004923 A

Control device for detecting depletion of a particle contg fluid from a sample reservoir comprises (a) a light source to impinge on fluid in the reservoir, (b) and a light detector close to a capillary exiting the reservoir to collect light reflected by the particles. (c) A signal generator attached to the light source and (d) a filter operably attached to the output of the detector.

ADVANTAGE - Easier analysis of red cell blood count.

US 4963498 A

Analytical flow process comprises monitoring the flow of test sample soln. and reagent(s) through a narrow tube under the combined effects of capillary force and gravitation by measurement of colour intensity, optical refraction, viscosity, conductance, etc; and comparison of the results with those obtd. using standard solns.

USE - The process is an aid for rapid clinical analysis and diagnosis. (20pp)n

US 4948961 A

A control device capable of simulating the flow of a particle-contg. fluid that is being measured by an analytical instrument utilising an analysis cartridge with an internal chamber through which particulate contg. fluids pass is provided.

The device comprises a control cartridge, a liq. crystal cell within said cartridge such to interpose between a light source and a light detector in the analytical instrument. A polarizing filter is provided close to the liq. crystal cell in the control cartridge so as to alternately allow and block passage of light between the light source and the detector when the voltage applied to the cell is modulated.

USE - For rapid analytical testing. (20pp)

US 4756884 A

Analytical device for detecting the presence of an analyte in a physiological fluid comprises a first capillary unit for pumping a

liquid from an inlet part to a chamber in a housing, and a second capillary unit between the chamber and an exit.

The housing contains a reagent of cpds. affecting blood clotting and antibodies. Two chambers may be disposed in the capillary path.

ADVANTAGE - Automatic monitoring of medicines.

Derwent Class: A89; B04; D15; J04; S03; S05

International Patent Class (Main): G01N-021/03; G01N-021/49; G01N-033/86

International Patent Class (Additional): B01L-003/00; B29C-065/08;

G01D-018/00; G01N-011/04; G01N-015/14; G01N-021/00; G01N-021/01;  
G01N-021/51; G01N-031/22; G01N-033/48; G01N-033/483; G01N-033/50;  
G01N-033/53; G01N-033/543; G01N-035/00; G01N-035/02